



NODC Data, Services and It's New Geoportal Server



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Overview

- **NODC's Data and Services**

NODC's Mission-scientific stewardship

Archive Paradigm

Bring Geoportal Server to NODC

- **An overview of NODC's Geoportal Server:**

Implementation highlights: multiple service links; temporal search, spatial search, improved browse tree, ocean basemap, and ocean locator demo

- **More from NODC's Geoportal Server**

Human to machine

machine to machine

Bringing it all together

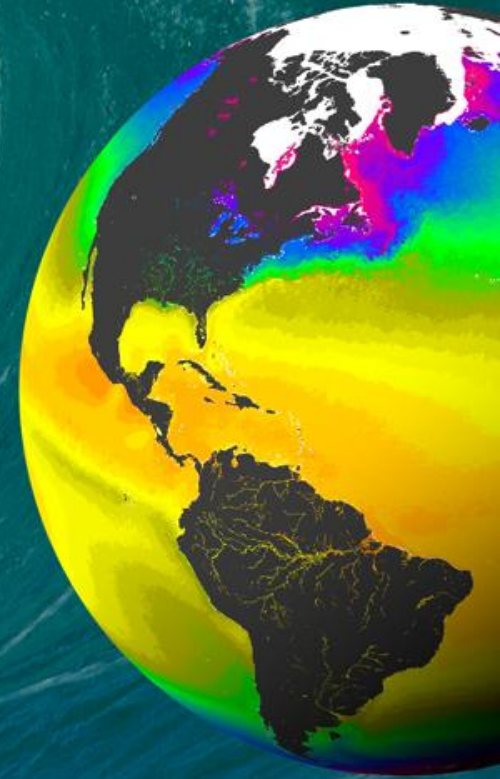
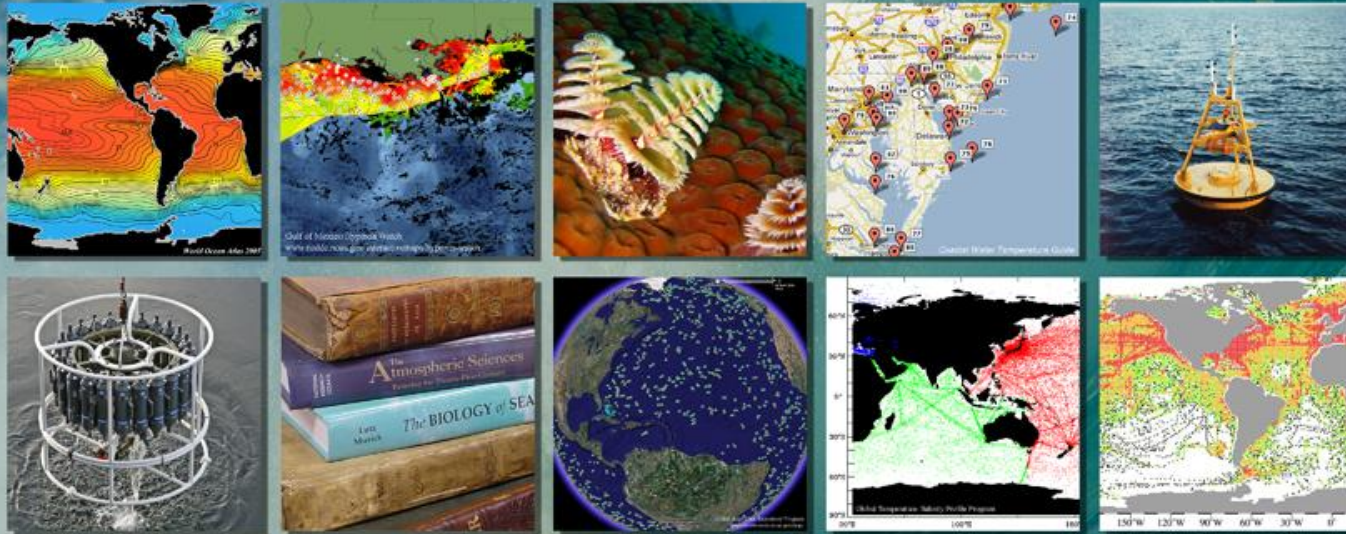
- **Usability test results and future implementation plan**



NODC's Data and Services

NOAA National Oceanographic Data Center

An Ocean of Data and Information...



Mission: To provide scientific stewardship of national and international marine environmental and ecosystem data and information





Scientific Stewardship

- **Acquire**: receive ocean data from U.S. and foreign sources
- **Archive**: preserve those data assets for the long term
- **Access**: provide access to archived data for business, federal, science, and many other users
- **Add Value**: assemble easy-to-use, long term collections for science and applications



NODC *Archive* Paradigm

Human and machine
interfaces to

*Understand, Preserve,
Discover, Access, and Use*

NODC Archive Holdings



The NODC Ocean Archive



Understand and Preserve

Metadata

FGDC

ISO

Ad hoc docs

Other standards

AIP

AIP

AIP

AIP

AIP

The NODC Ocean Archive

Access and Use

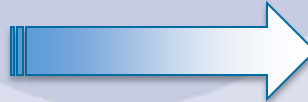
LAS, GIS, KML



WCS, WMS



DAP, THREDDS



FTP and HTTP

AIP

AIP

AIP

AIP

AIP

The NODC Ocean Archive

Enhanced online access, visualization, and analysis tools

Distributed Access Protocol (DAP) and THREDDS catalogs

Basic FTP/HTTP access for all Archival Information Packages (AIP) in the NODC Ocean Archive



Discovery

Human to Machine Interfaces

Google

Data.gov

GOS

OAS

Geoportal Server Web App

Machine to Machine Interfaces

CSW

Geoportal Server REST API

OpenSearch

SRU/ISO23950

WAF

AIP

AIP

AIP

AIP

AIP

The NODC Ocean Archive



An Overview of NODC's Geoportal Server



Highlights from NODC's Geoportal Implementations



- Multiple service links
- Temporal search
- Browse by keywords
- NODC's ocean locator
- NODC's ocean basemap
- Demo



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NODC HOME SEARCH BROWSE SEARCH TIPS

Search

Search metadata content, e.g. title:SST; use "AND" for multiple keywords, e.g. water AND temperature; use "" to search for an exact phrase, e.g. "water temperature" (Search tips!)

sstAND ODYSSEA

Search Clear All

Additional Options

WHEN

☒ Dates overlap range ☐ Dates within range

From: (yyyyymmdd) To: (yyyyymmdd)

WHERE

☐ Anywhere ☐ Intersecting

Free Text, Temporal, Spatial, Search

Ocean Locator Base map Bounding info

Results 1-1 of 1 record(s)

☒ Expand results [Zoom To Results](#) [Zoom To Search](#)

Analysed L4 foundation sea surface temperature North-Western European shelves data

The ODYSSEA North-West Europe Shelves Sea Surface Temperature is a daily cloud-free foundation sea surface temperature at 2 km resolution (0.02). It is generated by me...

[Website](#) [Details](#) [Metadata](#) [Download](#) [LAS](#) [TDS](#) [OPeNDAP](#) [FTP](#) [Zoom To](#)

See results through REST API: [GEORSS](#) [ATOM](#) [HTML](#) [FRAGMENT](#) [KML](#) [JSON](#)

OPeNDAP



Geoportal Server Discover via Browse

NODC Geoportal - Mozilla Firefox

data.nodc.noaa.gov/geoportal/catalog/search/browse/browse.page

Dataexamples NODC_Data ESRIGeoportal NODCGeoportalAdmin DataTools ERT TDS other perl Sea names CF javafamilies ArcGISserver Team

Login Help About Feedback

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UNITED STATES DEPARTMENT OF COMMERCE

NODC HOME SEARCH **BROWSE** SEARCH TIPS

Browse

Select a category below.

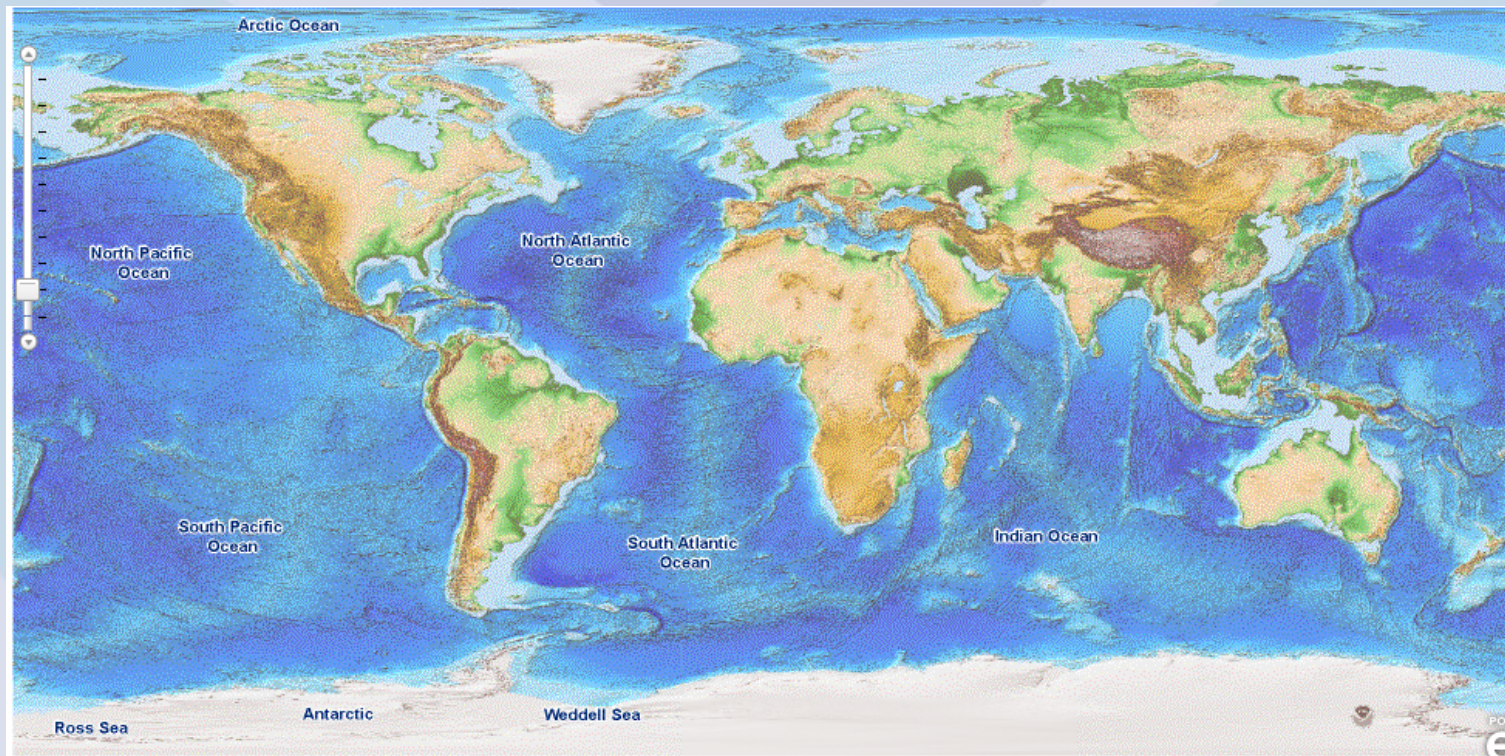
- People (Data submitters)
- Platforms
- Projects
- Institutions
- Sea names
- Data types
- Instruments
- Observations

Select one of the items in the tree to view a specific list of resources.

Browse tree provides another option of data Discovery and access with a further data Filter function

NODC Ocean Basemap

The original data layers include NGDC's EOTOPO1 (NGDC), NODC's Sea area and National Marine Sanctuaries map (VLIMAR and NODC), Large Marine Ecosystems map (NOAA LME), Global countries, states/provinces, and cities polygons (ESRI 2004), Marine Eco-regions of the World, the Exclusive Economic Zone (EEZ) boundaries (Conservation International). <http://data.nodc.noaa.gov/arcgis/rest/services/basemap8/MapServer?f=jsapi>





NODC Ocean Locator

The original data layers include NODC's Sea area and National Marine Sanctuaries map (VLIMAR and NODC), Coral Reef location map (NOAA CoRIS Team, the original GIS map was achieved from ReefBase), Large Marine Ecosystems map (NOAA LME), Global countries, states/provinces, and cities polygons (ESRI 2004), Marine Eco-regions of the World (WWF), the Exclusive Economic Zone (EEZ) boundaries (Conservation International). The ocean locator is updated whenever a new sea area location is defined in NODC's Ocean Archive System or new data layers are requested by the users.

Data.nodc.noaa.gov/geoportal

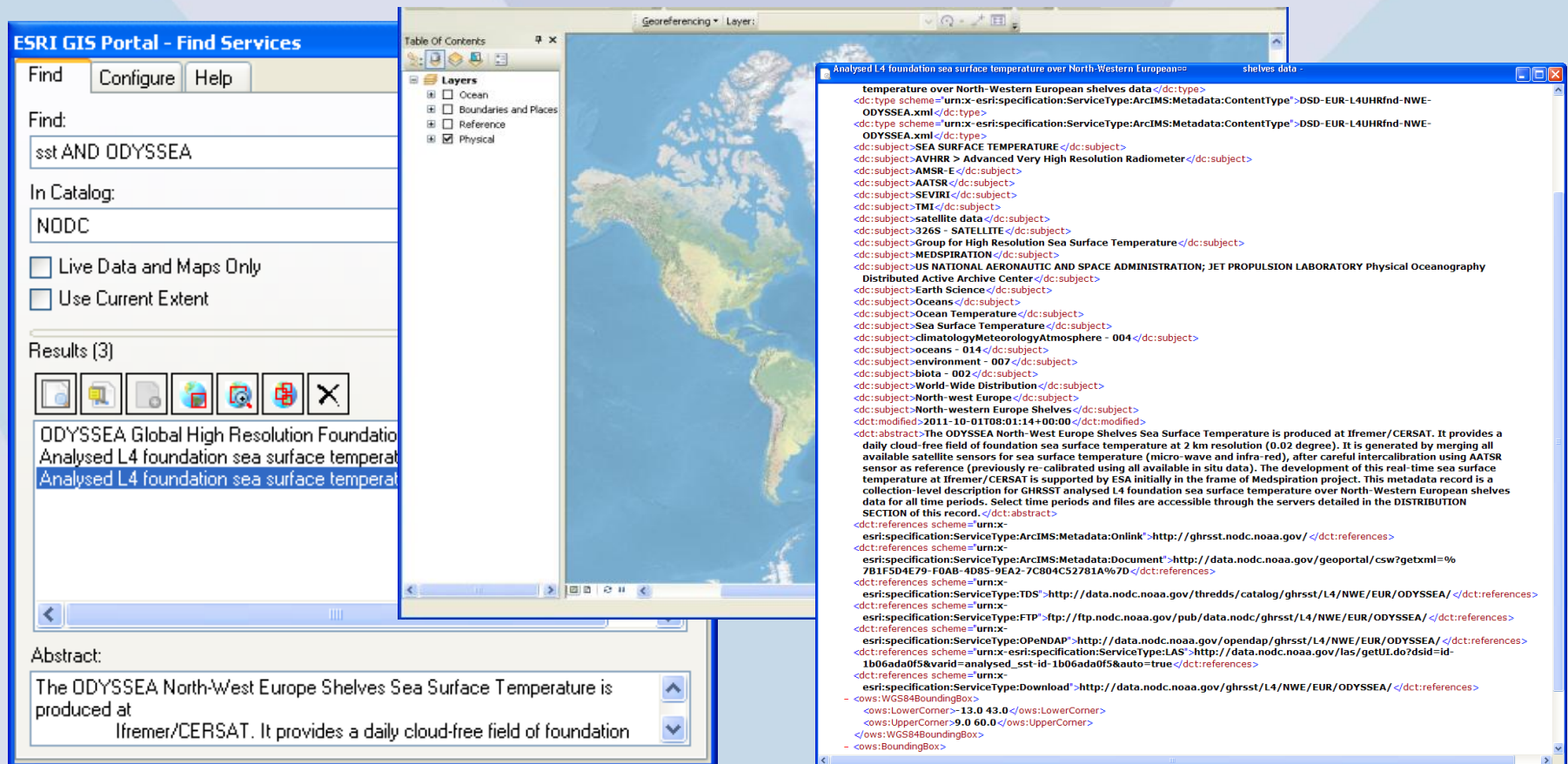
☒ Anywhere ☐ Intersecting ☐ Fully within



How NODC's Geoportal Server Enables Machine to Machine Search Capability and Brings all Together?

Machine to Machine- via CS/W

Example: A Search from Desktop-Arcmap>CSWclient returns the location of the data on the map and A brief metadata file with selected metadata fields




ESRI GIS Portal - Find Services

Find:

In Catalog:

☐ Live Data and Maps Only
☐ Use Current Extent

Results (3)



ODYSSEA Global High Resolution Foundation Analysed L4 foundation sea surface temperature

Abstract:

The ODYSSEA North-West Europe Shelves Sea Surface Temperature is produced at Ifremer/CERSAT. It provides a daily cloud-free field of foundation

Metadata File:

```
<?xml version="1.0" encoding="UTF-8"?>
<dc:title>temperature over North-Western European shelves data</dc:title>
<dc:type scheme="urn:x-esri:specification:ServiceType:ArcIMS:Metadata:ContentType">DSD-EUR-L4UHRfnd-NWE-ODYSSEA.xml</dc:type>
<dc:type scheme="urn:x-esri:specification:ServiceType:ArcIMS:Metadata:ContentType">DSD-EUR-L4UHRfnd-NWE-ODYSSEA.xml</dc:type>
<dc:subject>SEA SURFACE TEMPERATURE</dc:subject>
<dc:subject>AVHRR > Advanced Very High Resolution Radiometer</dc:subject>
<dc:subject>AMSR-E</dc:subject>
<dc:subject>AATSR</dc:subject>
<dc:subject>SEVIRI</dc:subject>
<dc:subject>TMI</dc:subject>
<dc:subject>satellite data</dc:subject>
<dc:subject>3268 - SATELLITE</dc:subject>
<dc:subject>Group for High Resolution Sea Surface Temperature</dc:subject>
<dc:subject>MEDSPIRATION</dc:subject>
<dc:subject>US NATIONAL AERONAUTIC AND SPACE ADMINISTRATION; JET PROPULSION LABORATORY Physical Oceanography Distributed Active Archive Center</dc:subject>
<dc:subject>Earth Science</dc:subject>
<dc:subject>Oceans</dc:subject>
<dc:subject>Ocean Temperature</dc:subject>
<dc:subject>Sea Surface Temperature</dc:subject>
<dc:subject>climatologyMeteorologyAtmosphere - 004</dc:subject>
<dc:subject>oceans - 014</dc:subject>
<dc:subject>environment - 007</dc:subject>
<dc:subject>biota - 002</dc:subject>
<dc:subject>World-Wide Distribution</dc:subject>
<dc:subject>North-west Europe</dc:subject>
<dc:subject>North-western European Shelves</dc:subject>
<dc:modified>2011-10-01T08:01:14+00:00</dc:modified>
<dc:abstract>The ODYSSEA North-West Europe Shelves Sea Surface Temperature is produced at Ifremer/CERSAT. It provides a daily cloud-free field of foundation sea surface temperature at 2 km resolution (0.02 degree). It is generated by merging all available satellite sensors for sea surface temperature (micro-wave and infra-red), after careful intercalibration using AATSR sensor as reference (previously re-calibrated using all available in situ data). The development of this real-time sea surface temperature at Ifremer/CERSAT is supported by ESA initially in the frame of Medspiration project. This metadata record is a collection-level description for GHRSSST analysed L4 foundation sea surface temperature over North-Western European shelves data for all time periods. Select time periods and files are accessible through the servers detailed in the DISTRIBUTION SECTION of this record.</dc:abstract>
<dc:references scheme="urn:x-esri:specification:ServiceType:ArcIMS:Metadata:Onlink">http://ghrsst.nodc.noaa.gov/</dc:references>
<dc:references scheme="urn:x-esri:specification:ServiceType:ArcIMS:Metadata:Document">http://data.nodc.noaa.gov/geoportal/csw?getxml=%7B1F5D4E79-F0AB-4D85-9EA2-7C804C52781A%7D</dc:references>
<dc:references scheme="urn:x-esri:specification:ServiceType:TDS">http://data.nodc.noaa.gov/thredds/catalog/ghrsst/L4/NWE/EUR/ODYSSEA/</dc:references>
<dc:references scheme="urn:x-esri:specification:ServiceType:FTP">ftp://ftp.nodc.noaa.gov/pub/data.nodc/ghrsst/L4/NWE/EUR/ODYSSEA/</dc:references>
<dc:references scheme="urn:x-esri:specification:ServiceType:OPeNDAP">http://data.nodc.noaa.gov/opendap/ghrsst/L4/NWE/EUR/ODYSSEA/</dc:references>
<dc:references scheme="urn:x-esri:specification:ServiceType:LAS">http://data.nodc.noaa.gov/las/getUI.do?dsid=id-1b06ada0f5&varid=analysed_sst-id-1b06ada0f5&auto=true</dc:references>
<dc:references scheme="urn:x-esri:specification:ServiceType:Download">http://data.nodc.noaa.gov/ghrsst/L4/NWE/EUR/ODYSSEA/</dc:references>
<ows:WGS84BoundingBox>
  <ows:LowerCorner>-13.0 43.0</ows:LowerCorner>
  <ows:UpperCorner>9.0 60.0</ows:UpperCorner>
</ows:WGS84BoundingBox>
<ows:BoundingBox>
```



Machine to Machine- OpenSearch

The screenshot displays the OpenSearch Client interface, which is a web-based search tool. The main window shows a search results page for the query "http://data.nodc.noaa.gov/g". The results are listed in a table with columns for "Title", "Description", "Date", and "Action". The first result is "Global 10km Analyzed SST data set" with a description mentioning "The through-cloud capabilities of microwave radiometers provide a valuable picture of global sea surface temperature (SST) while infrared radiometers (MODIS) have a higher spatial resolution. To utilize these SSTs, scientists...". The second result is "K10 L4 sea surface temperature analysis produced daily on an operational basis at the Naval Oceanographic Office using a weighted average of AVHRR, GVAR, and AMSRE SST retrievals. Pathfinder 9km climatology is used when no...". The third result is "TMI 25km gridded SST data sets" with a description mentioning "Version-3b TMI Ocean Products, in November 1997, the TMI radiometer with a 10.7 GHz channel was launched aboard the TRMM satellite. The important feature of microwave retrievals is that SST can be measured through clouds, w...". The fourth result is "AMSRE 25km gridded SST data sets" with a description mentioning "The Advanced Microwave Scanning Radiometer (AMSR-E) was launched on May 4, 2002, aboard NASA's Aqua spacecraft. The National Space Development Agency of Japan (NASDA) provided AMSR-E to NASA as an indispensable part of Aqua...". The fifth result is "TMI geolocated L2 orbital SST data sets" with a description mentioning "Version-3b TMI Ocean Products, in November 1997, the TMI radiometer with a 10.7 GHz channel was launched aboard the TRMM satellite. The important feature of microwave retrievals is that SST can be measured through clouds, w...". The sixth result is "MODIS Aqua L2P swath SST data sets" with a description mentioning "The production of the MODIS L2P data is a joint collaboration between JPL, OBPG and RSMAS. RSMAS is responsible for sea surface temperature algorithm development, error statistics and quality flagging, while the OBPG is NAS...". The seventh result is "MODIS Terra L2P swath SST data sets" with a description mentioning "The production of the MODIS L2P data is a joint collaboration between JPL, OBPG and RSMAS. RSMAS is responsible for sea surface temperature algorithm development, error statistics and quality flagging, while the OBPG is NAS...". The eighth result is "North Sea and Baltic Sea L4 SST data sets" with a description mentioning "The L4 analysis is based upon nighttime GHSST L2P subskin SST observations from several satellites and instruments such as: AMSRE, ATS_NR_2P, AVHRR18, G, AVHRR17, NAB, AVHRR16, NAB, and SEVIRI...". The ninth result is "TMI geolocated L2 orbital SST data sets" with a description mentioning "Version-3b TMI Ocean Products, in November 1997, the TMI radiometer with a 10.7 GHz channel was launched aboard the TRMM satellite. The important feature of microwave retrievals is that SST can be measured through clouds, w...". The tenth result is "MODIS Aqua L2P swath SST data sets" with a description mentioning "The production of the MODIS L2P data is a joint collaboration between JPL, OBPG and RSMAS. RSMAS is responsible for sea surface temperature algorithm development, error statistics and quality flagging, while the OBPG is NAS...".



Geoportal Server –REST URL

- [http://data.nodc.noaa.gov/geoportal/rest/find/document?searchText=+\(Temperature\)+\(sdate: \[1986 TO 1990\]\) + \(edate:\[1986 TO 1990\]\)&start=1&max=25&spatialRel=esriSpatialRelWithin&bbox=137.72,33.36,143.29,36.14&f=html](http://data.nodc.noaa.gov/geoportal/rest/find/document?searchText=+(Temperature)+(sdate:[1986 TO 1990])+(edate:[1986 TO 1990])&start=1&max=25&spatialRel=esriSpatialRelWithin&bbox=137.72,33.36,143.29,36.14&f=html)
- "Show me in HTML format the first 25 datasets with the keyword *temperature*, between 1986 and 1990, within the bounding box 137.72 E to 143.29 E and 33.36 N to 36.14 N"
- Want it in KML? Change the "html" to "kml".

Geoportal Server Components





Usability Test Results and Future Implementation Plan



Usability Test Results- Background

ESRI's geoportal server was designed for users who have GIS background. NODC did many customizations to make the gpt server be easier to both GIS and non-GIS users. To evaluate the changes and get ideas for future implementations, we conducted usability test within a small group of data users.



Usability Test Results- Questions List

Query	Which part do you find difficult? 1. Free text; 2. Temporal search; 3.Spatial search; or any other comments
1. Water temperature, wave height data for Gulf of Mexico during the past 5 years	
2. Wind data from remote sensing for California coast	
3. Ocean current data for Chukchi Sea for a time period covering 2009 to present	
4. Station data from a NOAA cruise e.g. "Townsend Cromwell" from 1960s	
5. Can you find this data with the following information Place: Black Sea Institution: Woods Hole Oceanographic Institution (WHOI) Data collected: 2003	
6.Please define a search by yourself and provide a short description below: ☺	
Suggestions:	

The test queries were selected from real user requests to NODC. Normally when users could not figure out how to find the data, they send the requests to NODC's user services. The average time used for each test is between 15 to 45 minutes.



Usability Test Results- More About The Testers

32 out of 34 users provided their contact information; and 19 of them are willing to be in touch with us for future updates.

40% students

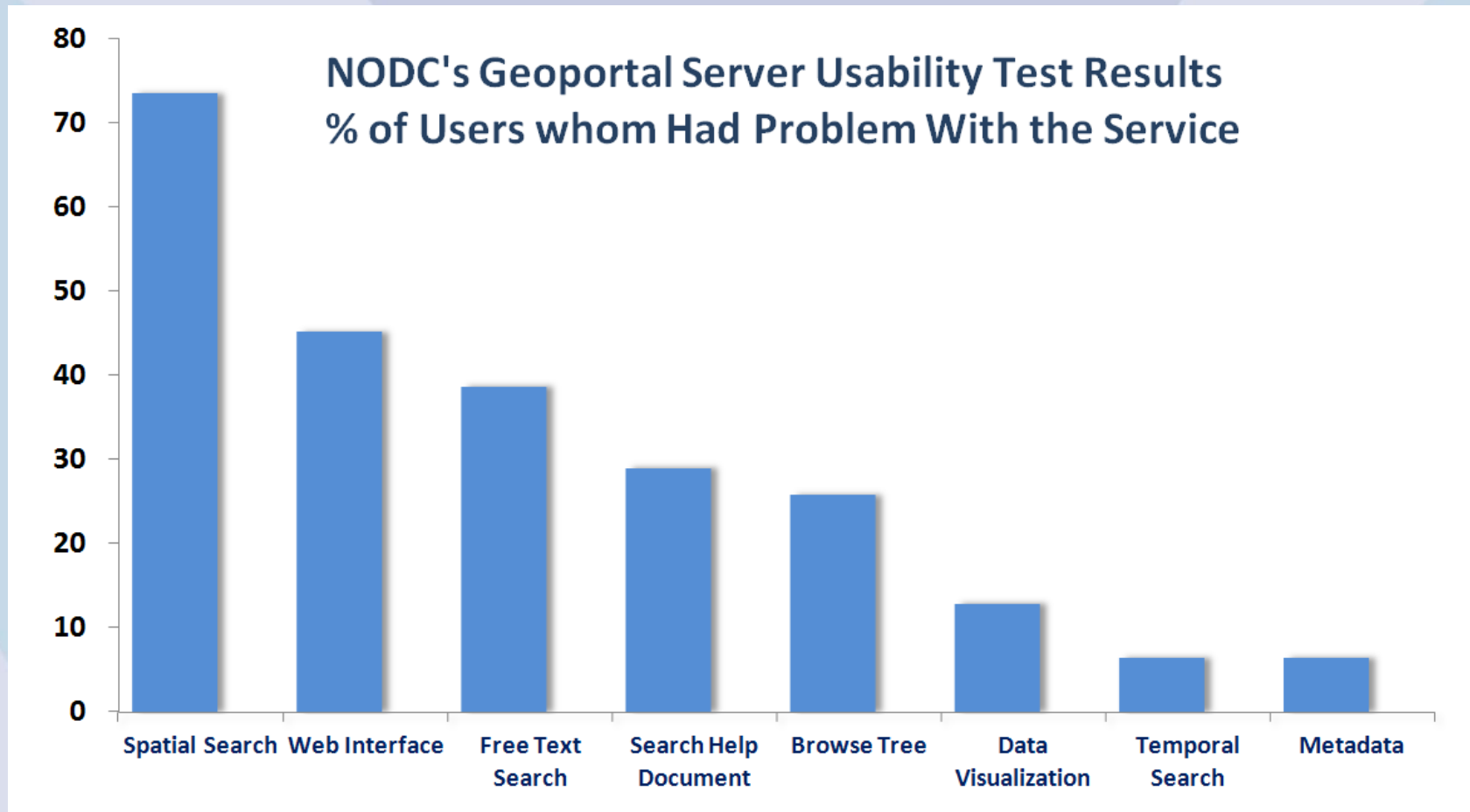
60% researcher/scientist

28% data management

Testers are from America, Asia, and Europe with good English or poor English skills



Usability Test Results





Future implementation plan

- Map locator: improve the map layout; make the locator work with automatic zoom
- Free text search: configure the search default syntax; add ontology service to Geoportal Server
- Web interface: distinguish between two ways of search; make the most popular REST APIs shown on top of the results list; others
- Data visualization: on-going
- ISO19115-2 metadata capability: on-going with ncISO (NGDC) metadata and ISO19115 metadata from the xsl (NCDDC) transformation



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- A big thank you to Jefferson Ogata, John Relph, Donald Collins, Andy Allegra, Kelly Logan, Matthew Austin



Thank You!